(54) Title: DEVICE AND METHOD FOR GENERATING AN ALERT SIGNAL
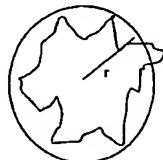
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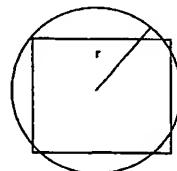
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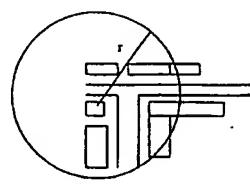
District

(57) Abstract: The invention relates to a device and method for generating an alert signal based on the geographical position of the device, optionally also based on time or date. The alert signal is generated when the device is within a certain distance from a predefined location taking into account the fact that certain tasks or actions can only be taken when the user is at this location. Thus, the invention provides a device for generating an alert signal comprising: positioning means for updating and storing an actual position of the device; location storage means for storing the location of a place of interest; means for storing a request for an alert signal associated with the location of a place of interest; and trigger means for comparing the actual position of the device with the location of a place of interest and triggering generation of said alert signal when the distance between the actual position of the device and the location of a place of interest is less than a predetermined value. The device is suitably a mobile telephone.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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DEVICE AND METHOD FOR GENERATING AN ALERT SIGNAL

Field of the invention

The present invention relates to a device and method for generating an alert
5   signal based on the geographical position of the device, optionally also based on
time or date. The alert signal is generated when the device is within a certain
distance from a predefined location taking into account the fact that certain tasks or
actions can only be taken when the user is at this location. The device is suitably a
mobile telephone.

10

State of the art

It is well known to use time-based calendars in portable devices such as
mobile telephones. Reminders are presented on the device when the actual time
matches a calendar event previously entered by the user in the calendar. Also,
15   positioning services are well known such as GPS (Global Positioning System) and
various positioning services in mobile telecommunication networks. The standard
positioning services usually give position and in same case suggestions for nearby
gas stations, shops, cinemas, etc.

The problem today is that the time based calendar function only refers to
20   time instances. For some tasks you will only be able to perform them at a specific
location, sometimes regardless of time. Having an ordinary "to-do list" is neither an
option because you cannot check this list at every time instance and every time you
visit a new place.

25   Summary of the invention

The invention exploits the novel idea that one should be able to set a calendar
event but not solely based on a certain time but rather on position. This means that
whenever you are close to a certain location you will be reminded by the calendar
event. In fact, some "calendar" events are triggered regardless of time since they
30   only depend on location.

In a first aspect the invention provides a device for generating an alert signal
comprising:
positioning means for updating and storing an actual position of the device;
location storage means for storing the location of a place of interest;
35   means for storing a request for an alert signal associated with the location of a place
of interest; and
trigger means for comparing the actual position of the device with the location of a
place of interest and triggering generation of said alert signal when the distance
between the actual position of the device and the location of a place of interest is

less than a predetermined value.

Preferably, the predetermined value is variable, and may be set individually for each request for an alert signal.

5

Suitably, the location storage means includes a personal map program and/or a browser for finding locations on a telecommunications network.

The browser may be a WAP browser for finding locations on the Internet.

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In one embodiment, the positioning means is arranged to update the actual position of the device every time the device changes base station and/or at regular time intervals.

15 In another embodiment, the positioning means is arranged to update the actual position of the device every time the device the device has moved a distance, for instance 100 meters.

In still another embodiment the positioning means is arranged to update the actual
20 position of the device in dependence of the speed of the device.

In a further embodiment, the device comprises:
calendar means for storing calendar entries;
clock means for keeping track of the actual time;
25 further trigger means for comparing the actual time with a calendar entry and triggering generation of said alert signal when the actual time matches the calendar entry, but only when the distance between the actual position of the device and the location of a place of interest is less than the predetermined value.

30 Suitably, the calendar entry matches the actual time once only or the calendar entry matches the actual time repeatedly for a specified time unit, such as day/week/month/year.

The positioning means may comprise a GPS receiver.
35

The device may be a portable telephone, a pager, a communicator, a smart phone, a positioning device or an electronic organiser.

In a second aspect the invention provides a method for generating an alert signal in

a device comprising the steps of:

updating and storing an actual position of the device;

storing the location of a place of interest;

storing a request for an alert signal associated with the location of a place of

5   interest; and

comparing the actual position of the device with the location of a place of interest
and triggering generation of said alert signal when the distance between the actual
position of the device and the location of a place of interest is less than a
predetermined value.

10

Preferably, the predetermined value is variable, and is set individually for each
request for an alert signal.

Suitably, the location storage is supplied by means of a personal map program
15   and/or by means of a browser for finding locations on a telecommunications
network.

The browser may be a WAP browser for finding locations on the Internet.

20   In one embodiment, the actual position of the device is updated every time the
device changes base station and/or at regular time intervals.

In another embodiment, the actual position of the device is updated every time the
device the device has moved a distance, for instance 100 meters.

25

In still another embodiment the actual position of the device is updated in
dependence of the speed of the device.

In a further embodiment, the method comprises the steps of:

30   storing calendar entries;

keeping track of the actual time;

comparing the actual time with a calendar entry and triggering generation of said
alert signal when the actual time matches the calendar entry, but only when the
distance between the actual position of the device and the location of a place of

35   interest is less than the predetermined value.

Suitably, the calendar entry matches the actual time once only or repeatedly for a
specified time unit, such as day/week/month/year.

The step of updating and storing the actual position of the device may comprise receiving GPS signals.

Also, the step of updating and storing the actual position of the device may
5   comprise receiving position information from a mobile telecommunication network.

Suitably, the mobile telecommunication network uses EOTD (Enhanced Observed Time Difference) or OTDOA (Observed Time Difference On Arrival).

10   Brief description of the drawings
         The invention will be described below with reference to the accompanying drawing, in which the only figure is three views of various distances applied in the present invention.

15   Detailed description of preferred embodiments
         The invention will be described by means of a mobile telephone as an example. A person skilled in the art will realize that the invention is also applicable in other devices, such as pagers, communicators, smart phones, positioning devices or electronic organizers.
20   As is conventional, the mobile telephone software includes a time based calendar function capable of generating signals triggered when the internal clock of . the phone matches the calendar entry. An alert signal can be any kind of signal, such as audible signals, visual signals and messages shown on the display of the telephone. The user enters in advance what kind of signal is requested and at what
25   time. The calendar includes a function for generating the alert signal once only, or repeatedly, e.g. at the same time each day, each week, each month, or even each year, etc.
         The device also incorporates a function for knowing its own position. Today there exist various possibilities such as GPS (Global Positioning System) based on
30   satellites, and location/positioning services within mobile telecommunication systems using e.g. triangulation with reference to known positions of base stations. Any positioning service can be used with the present invention. In mobile systems an EOTD (Enhanced Observed Time Difference) is used within GSM (Global System for Mobile Communications) and GPRS (General Packet Radio Service) or
35   OTDOA (Observed Time Difference On Arrival) in the third generation systems. The accuracy provided by EOTD or GPS is in most cases sufficient for the application. Below ten metres is usually not needed for the functionality contemplated in the present invention.
         Thus, the actual position of a device is updated and stored in the positioning

means of the device. When and how often the position is updated may depend on the movement of the device or on time or both. E.g. the position is updated every time the device has moved a distance, for instance 100 meters. Also, the update rate could be dependent of the speed of the device. If the device moves quickly, the
5 updates are more frequent. If the device does not move at all, the position need not be updated. Also, the position can be updated every time the device changes base station in a handover. Based on time, the position can be updated at regular time intervals, such as every ten minutes or every hour, optionally dependent upon the speed of the device.
10   The location of places where the user wants to be reminded of things to do is also stored in the device. The positioning data for the wanted location can be supplied either by yellow pages or advertisements over the web, e.g. by means of the phone's WAP browser, or a personal map program. Such programs are usually supplied with the GPS software enabling the user himself to search the co-ordinates.
15 Printed and other published maps can be downloaded in the device from a computer. After a while the user will have his favourite locations stored just to choose from a list – just like the phone book.
        Thus, the phone's actual position can be compared with a location of a place of interest stored in the telephone. When the distance between those two positions is
20 less than a value the phone can respond by generating an alert signal. The distance can be fixed but is preferably variable so that the user can set a limit depending on the location of the place of interest and the nature of the task.
        The alert signal can be triggered based on this distance alone, but can also be conditional based on the actual time by combination with the time-based calendar.
25 A few examples are given below with reference to figure 1.
        In the first example the distance between the actual position of the device and the position of the place of interest is set at a rather large value r. The user may want to visit a certain shop or restaurant next time he is in a specific town. In this case the distance is set at a large value, e.g. ten kilometres, so that the whole town is
30 included. Since the user does not visit this town very often he is not disturbed by unnecessary alarms. Also, he may not know beforehand when he will visit the town next time, so the actual time he will go there is not possible or relevant to enter. Another example is that a friend tells the user about a terrific place he has visited on his last trip, and the user wants a reminder to go there next time he is passing by this
35 place.
        Another example is when the distance is set to a lower value. It may e.g. be walking distance within a district of the user's hometown. The user may want to be reminded to visit a certain shop when he is in the vicinity but he does not want to be reminded every time he is in town. In this instance the distance r may be set at a few

hundred metres.

Another example is when the distance r is set to only include a specific building, such as the user's home, place of work, the library, etc. When the user gets home he may want to be reminded to check the contents of the fridge; or when the user is visiting a friend's home he wants to be reminded to borrow a book or a record; or when the user is visiting his summer cottage he wants to be reminded to water the plants or bring home the tools he left there last time.

The above reminders can be generated each time the distance between the actual position of the device and the location of the place of interest is less than the set value r. However, in some instances the user wants only to be reminded at certain times. E.g. the user wants to be reminded to re-new the company parking ticket at the last working day of the month. In this case the user requests an alert signal to be generated when he is within the building of his place of work at the last working day of the month. He can also schedule his meetings and only be reminded when at work with a similar entry in the location-based and time-based calendar. In these cases, the alert signal is only generated when both the time and location conditions are satisfied.

The user can respond to the alert signal by a confirmation, resulting in that the calendar entry is deleted or repeated as the case may be. E.g. the alert signal can be confirmed by:

a)   OK (deletion)

b)   Remind me in 5 minutes (repetition), or

c)   Remind me next time I come here instead (location-based repetition).

The repetition time can be set to be dependent on the distance r. For example, if r is small, such as when the reminder is triggered in a building, the repetition time is set at 10 minutes, but when r is large, such as when the reminder is triggered in a city, the repetition time is set at one hour. The presumption is that it takes longer to leave a city than a building before the postponed action is forgotten.

A person skilled in the art will realize that there are many ways to implement the invention. The form and function of the time-based and location-based calendar may vary in many respects. The scope of the invention is only limited by the claims below.

CLAIMS

1.   A device for generating an alert signal comprising:
        positioning means for updating and storing an actual position of the device;
        characterised by
        location storage means for storing the location of a place of interest;
        means for storing a request for an alert signal associated with the location of a
        place of interest; and
        trigger means for comparing the actual position of the device with the location
        of a place of interest and triggering generation of said alert signal when the
        distance between the actual position of the device and the location of a place of
        interest is less than a predetermined value (r).

2.   A device according to claim 1, **characterised** in that the predetermined value
        (r) is variable, and may be set individually for each request for an alert signal.

3.   A device according to claim 1 or 2, **characterised** in that the location storage
        means includes a personal map program.

4.   A device according to claim 1, 2 or 3, **characterised** in that the location
        storage means includes a browser for finding locations on a telecommunications
        network.

5.   A device according to claim 4, **characterised** in that the browser is a WAP
        browser for finding locations on the Internet.

6.   A device according to any one of claims 1 to 5, **characterised** in that the
        positioning means is arranged to update the actual position of the device every
        time the device changes base station.

7.   A device according to any one of claims 1 to 5, **characterised** in that the
        positioning means is arranged to update the actual position of the device at
        regular time intervals.

8.   A device according to any one of claims 1 to 5, **characterised** in that the
        positioning means is arranged to update the actual position of the device every
        time the device has moved a distance, for instance 100 meters.

9.   A device according to any one of claims 1 to 5, **characterised** in that the
        positioning means is arranged to update the actual position of the device in

dependence of the speed of the device.

10.   A device according to any one of the preceding claims, **characterised** by further comprising:
calendar means for storing calendar entries;
clock means for keeping track of the actual time;
further trigger means for comparing the actual time with a calendar entry and triggering generation of said alert signal when the actual time matches the calendar entry, but only when the distance between the actual position of the device and the location of a place of interest is less than the predetermined value (r).

11.   A device according to claim 10, **characterised** in that the calendar entry matches the actual time once only.

12.   A device according to claim 10, **characterised** in that the calendar entry matches the actual time repeatedly for a specified time unit, such as day/week/month/year.

13.   A device according to any one of the preceding claims, **characterised** in that the positioning means comprises a GPS receiver.

14.   A device according to any one of the preceding claims, **characterised** in that the device is a portable telephone, a pager, a communicator, a smart phone, a positioning device or an electronic organiser.

15.   A method for generating an alert signal in a device comprising the steps of:
updating and storing an actual position of the device;
characterised by the further steps of:
storing the location of a place of interest;
storing a request for an alert signal associated with the location of a place of interest; and
comparing the actual position of the device with the location of a place of interest and triggering generation of said alert signal when the distance between the actual position of the device and the location of a place of interest is less than a predetermined value (r).

16.   A method according to claim 15, **characterised** in that the predetermined value (r) is variable, and is set individually for each request for an alert signal.

17. A method according to claim 15 or 16, **characterised** in that the location storage is supplied by means of a personal map program.

5 18. A method according to claim 15, 16 or 17, **characterised** in that the location storage is supplied by means of a browser for finding locations on a telecommunications network.

19. A method according to claim 18, **characterised** in that the browser is a WAP

10 browser for finding locations on the Internet.

20. A method according to any one of claims 15 to 19, **characterised** in that the actual position of the device is updated every time the device changes base station.

15

21. A method according to any one of claims 15 to 19, **characterised** in that the actual position of the device is updated at regular time intervals.

22. A method according to any one of claims 15 to 19, **characterised** in that the

20 actual position of the device is updated every time the device has moved a distance, for instance 100 meters.

23. A method according to any one of claims 15 to 19, **characterised** in that the actual position of the device is updated in dependence of the speed of the device.

25

24. A method according to any one of claims 15 to 23, **characterised** by the further steps of:
   storing calendar entries;
   keeping track of the actual time;

30 comparing the actual time with a calendar entry and triggering generation of said alert signal when the actual time matches the calendar entry, but only when the distance between the actual position of the device and the location of a place of interest is less than the predetermined value (r).

35 25. A method according to claim 24, **characterised** in that the calendar entry matches the actual time once only.

26. A method according to claim 24, **characterised** in that the calendar entry matches the actual time repeatedly for a specified time unit, such as

day/week/month/year.

27.   A method according to any one of claims 15 to 26, **characterised** in that the
       step of updating and storing the actual position of the device comprises
   5   receiving GPS signals.

28.   A method according to any one of claims 15 to 26, **characterised** in that the
       step of updating and storing the actual position of the device comprises
       receiving position information from a mobile telecommunication network.
10
29.   A method according to claim 28, **characterised** in that the mobile
       telecommunication network uses EOTD (Enhanced Observed Time Difference)
       or OTDOA (Observed Time Difference On Arrival).

15 30.   A method according to any one of claims 15 to 29, **characterised** in that the
       device is a portable telephone, a pager, a communicator, a smart phone, a
       positioning device or an electronic organiser.

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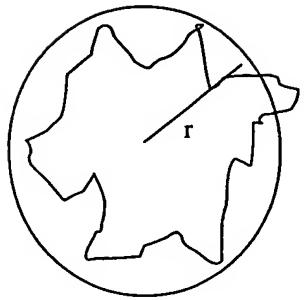
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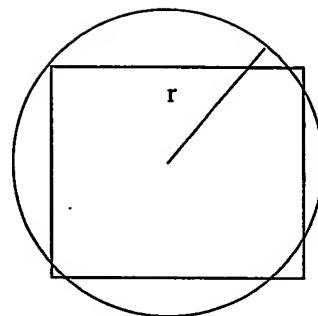
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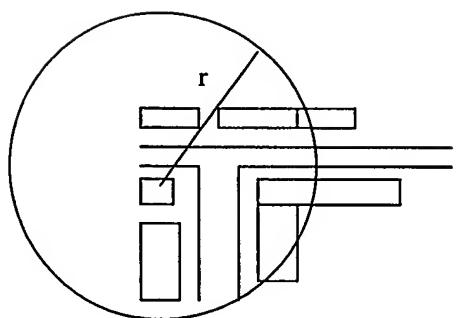
District

FIG 1

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7   H04Q7/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7   H04Q   G08B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	page 8, line 21 – line 30 page 9, line 11 – line 19 page 10, line 26 – page 12, line 4 page 12, line 11 – line 19 —————	7,9,21, 23,29
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[X]	Further documents are listed in the continuation of box C.	[X]	Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 April 2004	23/04/2004

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	De la Cruz Valera, D

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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